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Pervasiveness of Fasciolosis in Sheep in Yilmana-Densa District, West Gojjam Zone, Amhara Region, Northwestern Ethiopia

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Abstract: A cross sectional study was conducted from September to December 2011 to determine the prevalence and risk factors associated with ovine fasciolosis in Yilmana-Densa district, West Gojjam, Amhara region. For this purpose, 384 rectal faecal samples were collected from sheep and examined using the standard sedimentation technique to detect *Fasciola* eggs. Out of them, 163 (42.44%) were positive for fasciolosis. A statistical significant variation ($P < 0.05$) in prevalence was observed among age groups where higher prevalence was recorded in adults (51.40%) than young animals (17%). Likewise, there was a statistical significant difference ($P<0.05$) in infection prevalence within the sex groups in which it was higher in females (53.06%) than in male animals (23.74%). Significant variation ($P < 0.05$) in infection rate among different body condition scores was observed in which higher prevalence was recorded in poor (64.28%) than in good (22.77%) body conditioned animals. The present study revealed that infection of sheep by fasciolosis was attributed to the presence of favorable environment for the abundance of intermediate host and the parasite, hence requiring immediate strategic intervention against the disease.

Key words: Fasciolosis % Ovine % Prevalence % Sedimentation % Yilmana-Densa % Ethiopia

INTRODUCTION

In Ethiopia sheep are the dominant livestock providing up to 63% of cash income and 23% of food substance values obtained from the livestock production. Despite, the animals and the contribution of this sub sector to the nations economy is relatively low. Endo parasitic infection and management problems are known to be the main factor that defect productivity. The various species of gastrointestinal and pulmonary nematodes, trematodes and cestodes are known to be prevalent in Ethiopia [1]. Among the many parasitic problems of the domestic animals, fasciolosis is the major disease which imposes direct and indirect economic impact on livestock production in ruminants which are the natural host for *Fasciola* infestation particularly in cattle and sheep [2]. The disease is caused by digenean trematodes of the gens *Fasciola* commonly referred to as liver flukes. The two species most commonly implicated as the etiological agents of fasciolosis are *Fasciola hepatica* and *Fasciola gigantica* in Ethiopia [1]. *F. hepatic* has a world wide distribution but predominant in temperate zones. While *F.gigantica* is also found in most continents primarily in tropical [3].

Ovine fasciolosis in Ethiopia is very frequent and cause a significant economic loss in production, decrease productivity and loss of body condition [4, 5]. Many researchers have reported the presence of fasciolosis in sheep as 86.87% [6], 77.8% [7] and 88.58% [8] in different place of Ethiopia. However this important disease is not well addressed and assessed all over the country. This research is therefore aimed to show the prevalence and associated risk factors of ovine fasciolosis in Yelmana Densa district, Northwest Ethiopia.

MATERIALS AND METHODS

Description of the Study Area: A cross-sectional study was carried out in Yelmana Densa district, West Gojjam zone, Amhara region in three selected sites from September to December 2011. The district is located at altitude ranging from 1552 to 3535m. The average annual

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rainfall is 1270mm with the main rainy season, from May to October. The agro-climatic zone comprises lowland (12%), mid highland (64%) and highland (24%). The farming system in the area is mixed type (crop-livestock production). The livestock population of the area is estimated to be bovine, 123,220, ovine, 106,211, caprine, 15,772), equine, 22,886 and poultry 581,778 [9].

Study Animals: The study animals were 384 indigenous sheep, managed under traditional extensive system, owned by smallholders. They were of both sexes and two age groups. The age estimation was determined following the description of Aiello and May [10] and were considered as young (<6 months) and adult (> 6 months).

Study Design: A cross-sectional study design was used to determine the prevalence of ovine fasciolosis in the study area. Simple random sampling method was applied to select individual animals. To determine the sample size, an expected prevalence of 50 % was taken into consideration. The desired sample size was calculated using the formula given by Thrusfield [11] using 95% confidence interval and an absolute precision of 5%.

Sample Collection and Examination Procedures: A total of 384 faecal samples were collected directly from the rectum and were placed in clean screw capped sampling bottles. Each sample was clearly labeled with date, place of collection, sex and age and immediately transported to the district veterinary clinic laboratory. Samples that were not processed on the day of collection were stored in a refrigerator at 4°C. Specimens were subjected to sedimentation technique to detect *Fasciola* eggs. To differentiate eggs of *Paramphistomum* and *Fasciola*, a drop of 1% methylene blue solution was added to the sediment. Eggs of *Fasciola* species show yellowish color while eggs of *Paramphistomum* species stain by methylene blue [12, 13].

Data Analysis: All raw data generated from this study were coded and entered in MS Excel database system. Using SPSS version 16.0 computer program, data were analyzed. Chi-square test was used to determine the variation in infection prevalence between sex and age. Statistical significance was set at $P < 0.05$ or less to determine whether there are significant differences between the parameters measured between the groups.

RESULTS

Of the total 384 faecal samples subjected to examination, 163 (42.44%) were positive for *Fasciola* infection. Significant variation ($P < 0.05$) in prevalence among different body condition scores was observed in which higher prevalence was recorded in poor (64.28%) than in good (22.77%) body condition scores (Table 1).

Statistical analysis of prevalence among sheep of different age groups revealed significant variation ($P < 0.05$) where infection prevalence was higher in adults (51.40%) than young sheep (17%). Likewise, there was a statistical significant difference ($P<0.05$) in infection prevalence within the sex groups; it was higher in females (53.06%) and lower (23.74%) in male animals (Table 2).

DISCUSSION

The present study revealed an overall prevalence of ovine fasciolosis as 42.44%. The observed prevalence is relatively inline with previous studies conducted by Solomon and Abebe [14] who reported 38.04% in Fogera and Mecha districts, Amhara region, Bitew *et al.* [15] (49%) in and around Dawa-Cheffa, Kemissie. This may be attributed to the presence of similar favorable ecological factors for the breeding and development of snail intermediate hosts and the parasite. One of the most important factors that influence the occurrence of fasciolosis in an area is availability of suitable snail habitat [2, 16]. As reported by Heinonen *et al.* [17] water logged and poorly drained areas with acidic soils in the highlands are often endemic areas for fasciolosis.

The prevalence of fasciolosis recorded in the present study was higher than the previous report of Rahemato [4] and Ahmed *et al*. [1] being 33.5% and 13.2% around Wolisso town and in the middle Awash River basin, respectively. The reason might be due to the differences in temperature, moisture, humidity and soil that might favor multiplication of snail intermediate hosts. Urquhart *et al*. [2] also suggested that the difference in prevalence and severity of the disease syndromes are evident in various geographical regions depending on the local climatic conditions, availability of permanent water and system of management.

In the present study, highly significant difference ($P>0.05$) was observed among various body conditioned animals where higher prevalence was observed in poor body conditioned animals compared to good body condition. This may be due to importance of fasciolosis in

Table 1: Prevalence of ovine fasciolosis based on body condition scores

Body condition score	No of examined animals	No. of infected animals	Prevalence %	P^2	P-value
Poor	182	117	64.28%	45.509	0.000
Good	202	46	22.77%		
Total	384	163	42.44%		

Table 2: Prevalence of ovine fasciolosis based on age and sex category

Category	No of examined animals	No of infected animals	Prevalence %	P^2	P-value
Age					
Young (<6 months)	100	17	17%	42.120	0.000
Adult (>6 months)	284	146	51.40%		
Sex					
Male	139	33	23.74%	30.454	0.000
Female	245	130	53.06%		
Total	384	163	42.447%		

causing weight loss, a characteristic sign of disease of sheep of poor body condition vulnerable to parasitic disease [2].

The present study indicated that there was highly significant difference between age groups with a higher infection rate was in adults than young animals. This finding agrees with the work of Solomon and Abebe [14], Ahmed *et al*. [1], Woldu [18] and Bitew *et al*. [15] in different sites of Ethiopia. This could be due to the fact that young animals are not allowed to go far with adult animals for grazing, reducing the chance of exposure to infective metacercaria as compared to adults.

There was a significant difference ($P > 0.05$) in prevalence among the sex categories in which female animals are more prone to *Fasciola* infections than male animals. This may be due to the difference in management system of male and female animals in the study area in which adult males are mostly kept around homestead for fattening purpose in the study area. However, Ahmed *et al*. [1], Ahmed *et al*. [19] and Yemisrach *et al*. [20] suggested that fascioliasis equally affect both sexes.

The prevalence of the disease in different study sites was not found to be significantly different ($P>0.05$). This might be due to similarity in ecological conditions. Yilma and Malone [21] and Eyerusalem *et al*. [22] suggested that distribution of faciolosis depends on altitude. Differences in prevalence of ovine fasciolosis in different areas may be attributed to variations in ecological, climatic and animal husbandry practices.

CONCLUSION AND RECOMMENDATIONS

The result of the present study indicated that ovine fasciolosis is a widespread disease in the study area which could cause significant economic loss on the livestock production of the area. The relatively high prevalence reported in the present study has clearly indicated lack of strategic control measures against the disease as well as poor veterinary services. The study also confirmed that there are significant differences in prevalence among body condition, age and sex of animals. Our observation generally suggests that ovine fasciolosis is an endemic condition in the study area and is an indication of the existence of favorable bionomic and ecological conditions for the survival, multiplication and spread of intermediate snail host and the parasite in that environment.

Based on the given conclusion the following recommendations are foreword:

- Applications of strategic therapeutic treatment in conjunction with good pasture management practices should be conducted.
- Awareness creations need to be organized to livestock owners in relation to economical significance and control methods of the disease in the study area.
- Further studies on the epidemiological conditions and seasonal dynamics of parasites in the study area should be conducted to implement integrated control strategies.

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